

CLAY ADAMS® Brand
**Compact II
Centrifuge**

Model Nos.
420225
420227



**OPERATOR'S
MANUAL**

**BECTON
DICKINSON**

CLAY ADAMS® Brand
Compact II Centrifuge
Model Nos. 420225 and 420227
OPERATOR'S MANUAL

Becton Dickinson Primary Care Diagnostics
Becton Dickinson and Company
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Reorder No. 42022512

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Section 1. INTRODUCTION

1.1 INTENDED USE

The CLAY ADAMS® Brand Compact II Centrifuge (Figure 1-1) is a versatile, lightweight machine that incorporates an adjustable timer and safety cover, making it ideal for routine separation work in the physician's offices or other small laboratories. Relatively high speed (3200 rpm), combined with an angled rotor design that holds tubes at 37° from vertical, provides fast separation of materials of different densities and assures high deposition rates. Accessory adapters are supplied with the centrifuge to accommodate a variety of tubes including VACUTAINER® tubes with HEMOGARD™ closures.

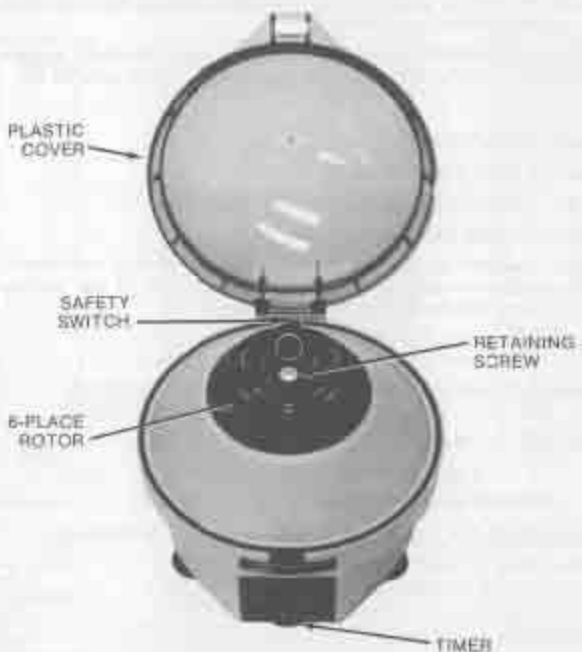


Figure 1-1. CLAY ADAMS Brand Compact II Centrifuge.

1.2 DESCRIPTION

The Compact II Centrifuge consists of a brushless synchronous motor mounted to a high strength mold plastic (or cast iron) base-plate, resting on three suction-type rubber feet to provide stability.

The angled rotor head is attached to the motor shaft by a drive ring and retaining screw. The head, when fitted with stainless steel shields, accommodates 6 tubes. A domed plastic cover encloses the rotor and actuates a safety interlock switch, which allows the motor to operate only when the cover is closed.

A mechanical escapement timer, electrically linked to a motor controller circuit, provides spin cycles of up to 30 minutes in 1 minute increments. A "hold" position on the dial also permits the timer knob to be set for continuous operation.

Compact II Centrifuges are available in the following models:
No. 420225 — 120 volts/60 Hz and No. 420227 — 220 volts/50 Hz.

1.3 SPECIFICATIONS

- Rotor: 6-place angled head.
- Motor: Synchronous, permanent split capacitor.
- Cover-actuated motor cutoff safety switch.
- Timer: mechanical, 30-minute adjustable in 1-minute increments, with continuous spin setting; accurate to $\pm 10\%$ of dial setting; on/off electrical control of motor circuit.
- Speed: 3200 rpm, Model 420225
2700 rpm, Model 420227
- Relative Centrifugal Force (RCF)*: 1103 x g, Model 420225
828 x g, Model 420227
- Electrical:

Model	Volts	Freq.	Amp.
# 420225	120	60 Hz	1.5
# 420227	220	50 Hz	0.8
- Power Cord: 6 ft (1.83m) grounded cord with 3 prong plug.
- Dimensions — Front to back: 26.7 cm (10.5 in);
Height, open: 35.6 cm (14.5 in);
closed: 21.6 cm (8.5 in).
- Weight: 5.8 kg (12.75 lb).

*at 10.2 cm radius, 15 ml. tubes

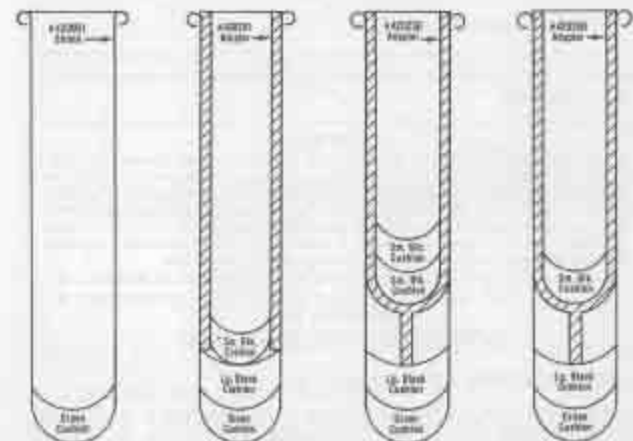
Section 2. INSTALLATION

2.1 INCLUDED PARTS

Except for rotor shields and special tube adapters, the Compact II Centrifuge is shipped fully assembled. Each of the six stainless steel shields (Cat. No. 420901) contains a green cushion. **These shields must be inserted in the rotor head before use.**

Shield adapters and applications for use with various size tubes are shown in the table below. Reorder numbers for rotor accessories are listed in Section 5.4.

ACCESSORIES SUPPLIED AND APPLICATIONS FOR VARIOUS TUBE SIZES



Application

- 15 mL, 17 x 120mm glass tubes, such as 420966 and 420972
- 15 mL VACUTAINER Tubes

Application

- 5 mL, 13 x 100mm tubes, such as 420981 and 420971
- 13 x 110mm VACUTAINER HEMOGARD Closure Tubes (Use small black cushion for this tube only)

Application

- For 3 mL VACUTAINER Tubes, use **two** small black cushions.

Application

- For 12 x 75mm tubes, such as 420982
- For 12 x 75mm VACUTAINER HEMOGARD Closure Tubes
- For 3 mL VACUTAINER Tubes, use **one** small black cushion

2.1 INCLUDED PARTS (continued)

The shields and rotor accessories contained in a labeled bag include the following:

- Stainless steel shield with installed green cushion — 6 each
- Large black rubber cushion (#420994) — 6 each
- Shield Adapter (#420250) — 6 each
- Shield Adapter (#420251) — 6 each
- Small black rubber cushion — 6 each

2.2 USE OF ROTOR ACCESSORIES

By using the rotor accessories according to the table on page 3, a variety of tube sizes may be centrifuged in the Compact II Centrifuge.

(IMPORTANT: When using the cushions, always be sure they are fully seated and that each tube rests on the cushion and not on the upper rim of the shield or shield adapter.)

2.3 POWER REQUIREMENTS

Connect the plug of the power cord to a grounded electrical receptacle rated for the voltage and frequency specified on the data plate of the centrifuge.

CAUTION

To avoid equipment damage and electrical hazards, connect power cord only to a 3-wire grounded receptacle delivering voltage and frequency specified on data plate on bottom of centrifuge. When only a 2-wire receptacle is available have it replaced with properly grounded 3-wire receptacle by qualified service technician in accordance with National Electrical Code. Do not remove grounding prong from power cord. If extension cord is required, use only 3-wire grounded cord having proper voltage and current rating.

Section 3. OPERATING INSTRUCTIONS

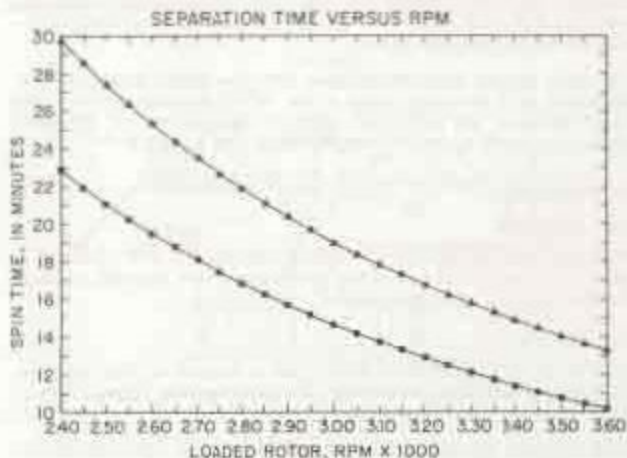
3.1 TEMPERATURE REQUIREMENTS

The Compact II is a general purpose centrifuge and is not recommended for the preparation of samples that require refrigerated processing. It is recommended that temperature of the operating environment be kept at 32°C (90°F) or lower. An idle period of 5 to 10 minutes between sequential runs, with the cover opened, is recommended to minimize temperature buildup.

3.2 SPEED VS TIME

The sedimentation of a sample is dependant upon the time and strength of the gravitational force (relative centrifugal force or RCF) to which the sample is subjected. Factors such as line voltage and rotor load will alter the speed (RPM) of the centrifuge rotor and, consequently affect the RCF. Centrifuge time can be extended to compensate for reduced RCF, thereby providing the required force-time product for proper sample preparation.

VACUTAINER® brand SST® Serum Separation Tubes specify 15 minutes spin at between 1000g and 1300g for proper separation. See Figure 3-1 for adjustments to spin time to achieve proper serum separation in SST Tubes.



- ▲ = MAXIMUM FOR PROPER SEPARATION (19,500 g - min)
- = MINIMUM FOR PROPER SEPARATION (15,000 g - min)

Figure 3-1. Spin Time Adjustment Curves for VACUTAINER® SST® Tubes

3.1 LOADING AND BALANCING ROTOR

For smooth operation and extended life of the centrifuge, loads should be angularly distributed and balanced as evenly as possible.

Note: Be sure all six shields are installed in the rotor head before inserting specimen tubes.

To balance the load, place tubes of equal weight opposite each other. When centrifuging an odd number of tubes, place a balance tube of equal weight opposite the odd tube.

CAUTION

To avoid equipment damage and possible injury, never balance the rotor by adding weights, mercury or lead shot to the bottom of a shield or tube.

3.4 STARTUP

With the tube loads balanced, close and latch the top cover. The centrifuge will not start unless the small red button of the interlock switch near the cover hinge is depressed.

For spins up to 30 minutes: turn the rotary knob clockwise past the 5-minute dial mark; then turn the knob clockwise or counterclockwise to the desired time setting.

For spins greater than 30 minutes: turn the rotary knob counterclockwise until the knob stops in the HOLD position. *Note:* In the HOLD position, the motor will start and remain on until the timer knob is manually turned clockwise to the OFF position.

3.5 STOPPING

3.5.1 Automatic

When the timer clocks down to zero (knob reaches OFF position), a bell will ring and electrical power to the motor will shut off, causing the rotor head to coast to a stop.

3.5.2 Manual

In order to interrupt a timed spin cycle or to stop continuous centrifugation (from a HOLD setting), manually turn the rotary knob of the timer to the OFF position.

Note: Opening the top cover will cause the safety interlock switch to shut off power to the motor; however, this procedure is not recommended for stopping the spin cycle. To avoid possible contact with the spinning rotor, **do not open the cover to stop the rotor.** Always turn the timer knob OFF and wait for the rotor to stop before unlatching and opening the cover.

3.8 PERIODIC INSPECTION OF ROTOR

WARNING

TO AVOID ELECTRICAL HAZARDS, THE CENTRIFUGE MUST BE UNPLUGGED PRIOR TO CLEANING, SERVICING, OR REMOVING THE ROTOR HEAD FOR ANY REASON.

Periodically inspect the rotor head for defects and signs of wear or stress that might impair its continued safe use. A thorough inspection requires removal of the rotor as follows: turn the head screw counterclockwise until unthreaded, and lift the rotor from the motor drive and shaft.

Reinstall the rotor by placing it on the shaft and aligning the slot in the bottom of the rotor with the key in the motor drive (Figure 3-2).

Important: To ensure that the rotor is properly installed on the motor drive, use the head screw to hold the motor shaft stationary while turning the rotor until it drops into place; then tighten the head screw. The head screw must be firmly tightened prior to use. The rotor is correctly installed if clearance between the rotor and housing is approximately $\frac{3}{32}$ inches maximum (Figure 3-2).

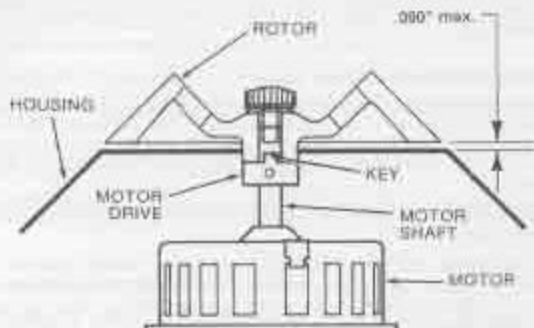


Figure 3-2: Cutaway View showing Correctly Installed Rotor

3.7 OPERATING PRECAUTIONS AND HAZARDS

To obtain properly centrifuged specimens and avoid damage or hazards, the following basic operating precautions should be carefully observed:

• Electrical Safety

- ☐ Operate the Centrifuge only at the line voltage and frequency specified on the data plate and from a grounded electrical outlet only.
- ☐ Unplug the power cord before attempting to clean, service or remove the rotor head for any reason.
- ☐ If the power cord is damaged, have it replaced by a qualified service technician.
- ☐ Never attempt to override the electrical safety switch of the Centrifuge.

• **Operating Precautions**

- ☐ For smooth operation and long service life, always place tubes in the rotor shields in a balanced array.
- ☐ For continued safety, periodically inspect the rotor as described in Section 3.6 of this manual.
- ☐ Always close and latch the top cover before operating the Centrifuge.

• **Infectious Disease Protection**

- ☐ Observe universal precautions when handling blood specimens and body fluids.
- ☐ Always use protective laboratory gloves when working with blood.
- ☐ Inspect tubes before centrifugation: cracked or scratched tubes should not be used.
- ☐ Do not place the Centrifuge in a biological safety cabinet or other container, since the motor may produce strong air currents and turbulence which may disrupt the laminar air flow, or heat rise may affect the sample.
- ☐ If a tube breaks in the Centrifuge, carefully remove broken glass with a hemostat or other device, using puncture-resistant utility gloves. Disinfect the Centrifuge as described in Section 5.2.2.

Section 4.

SPEED AND TIMER CHECKS

4.1 CHECKING ROTOR SPEED

The ADAMS Compact II Centrifuge is a fixed speed machine, with a nominal speed rating of 3200 rpm at 120 V/60 Hz. Speed should be checked periodically with a non-contact tachometer, such as an ADAMS Photoelectric Tachometer, Cat. No: 425205.

Perform the check with rotor shields and tubes installed. If operated at 120 VAC, 60 Hz, the speed measurement should be between **3060 and 3400 rpm**.* If the electrical supply is satisfactory and speed is outside the above specification, the motor is most likely defective. See Section 5.3 for replacement parts.

See Section 1.3 for 220V Model 420227 specifications.

4.2 CHECKING TIMER ACCURACY

Periodically check the timer for accuracy against a stopwatch at 10-, 20-, and 30-minute settings. The timer should not differ from the stopwatch readings by more than $\pm 10\%$.

Repeat the check(s), if necessary, to eliminate the possibility of knob/dial setting or procedural errors. If the timer fails to shut off properly or is inaccurate, it should be replaced. See Sections 5.3 and 5.4 for replacement procedures and parts.

*Speed is line voltage and frequency dependent.

Section 5.

MAINTENANCE AND SERVICE

5.1 LUBRICATION

The Compact II Centrifuge contains sealed, permanently lubricated bearings. No oiling or maintenance of bearings is required for the life of the machine.

5.2 CLEANING

5.2.1 General Cleaning

WARNING

TO AVOID ELECTRICAL HAZARDS, THE CENTRIFUGE MUST BE UNPLUGGED PRIOR TO CLEANING, SERVICING, OR REMOVING THE ROTOR HEAD FOR ANY REASON.

Use soap or a mild detergent and water to clean the cover, rotor, shields, and other parts of the centrifuge. (See below for special instructions on disinfecting the rotor and shields.) To prevent marring or scratching surface finishes, avoid the use of solvents or strong abrasives. Dry all surfaces with soft tissue or cloth.

5.2.2 Disinfecting Rotor, Shields and Adapters

To disinfect the rotor, remove it from the centrifuge as described in Section 3.4. Disinfect the rotor, shields, and adapters with a solution containing a 1:10 dilution of commercial sodium hypochlorite (5%). A 1:10 dilution can be prepared by adding one (1) part household bleach (e.g., CLOROX*) to nine (9) parts of water. Soak the rotor and other parts in the dilute bleach for at least ten (10) minutes to destroy the viral and bacterial contaminants.

After soaking in the dilute bleach solution specified above, completely immerse the parts in clean water. Rinse again under running water to remove all traces of the bleach.

Thoroughly dry shields and adapters; also dry the top and bottom surfaces of the rotor before re-installing. Oven-drying may be used, provided the temperature DOES NOT EXCEED 125°F (52°C).

IMPORTANT: The motor drive and head screw must be clean and dry before reassembling the rotor.

*Trademark of Clorox Company, Oakland, CA.

5.2.3 Replacing Cover Seal Ring

- a. Remove worn cover seal ring by peeling it from groove of housing (Figure 5-1).
- b. Scrape or rub off residual adhesive remaining in ring groove.
- c. Apply a coating of cyanoacrylate adhesive (or equivalent) along bottom of groove.
- d. Orient new ring as shown in Figure 5-1, and press firmly around circumference of groove. Make sure that open space between ends of ring is at rear of centrifuge.
- e. Allow adhesive to dry before closing lid.

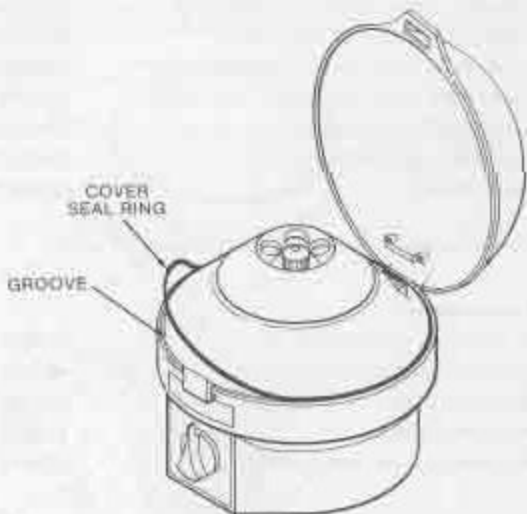


Figure 5-1. Cover Seal Ring.

5.3 REPLACEMENT PARTS LIST

Description	Reorder No.
• Centrifuge — See Item # in Figure 5-6	
1. Head Screw Assembly	42015103
2. Rotor Head (6 place)	42022502
3. Motor Drive*	42015102
4. Motor Assembly, Model 0225 (120 volts)*	42022501
5. Motor Assembly, Model 0227 (220 volts)*	42022701
6. Seal Ring	42022503
7. Timer*	42022505
8. Timer Knob	42022504
9. Capacitor, Model 0225 (120 volts)*	42022506
10. Capacitor, Model 0227 (220 volts)*	42022702
11. Power Cord Assy., Model 0225 (120 volts)*	42022509
12. Power Cord Assy., Model 0227 (220 volts)*	42022703
13. Rubber Feet (package of 3)	42000106
14. Wire Clamp (package of 3)	42022507
15. Safety Switch*	42022508

*For replacement, refer to authorized service center only

• Rotor Accessories

Shield, Stainless, with cushion (1)	420901
Rubber cushion, large, black (12/pk)	420944
Shield adapter (4/pk)	420250
Shield adapter (4/pk)	420251
Rubber cushion, small, black (4/pk)	420249

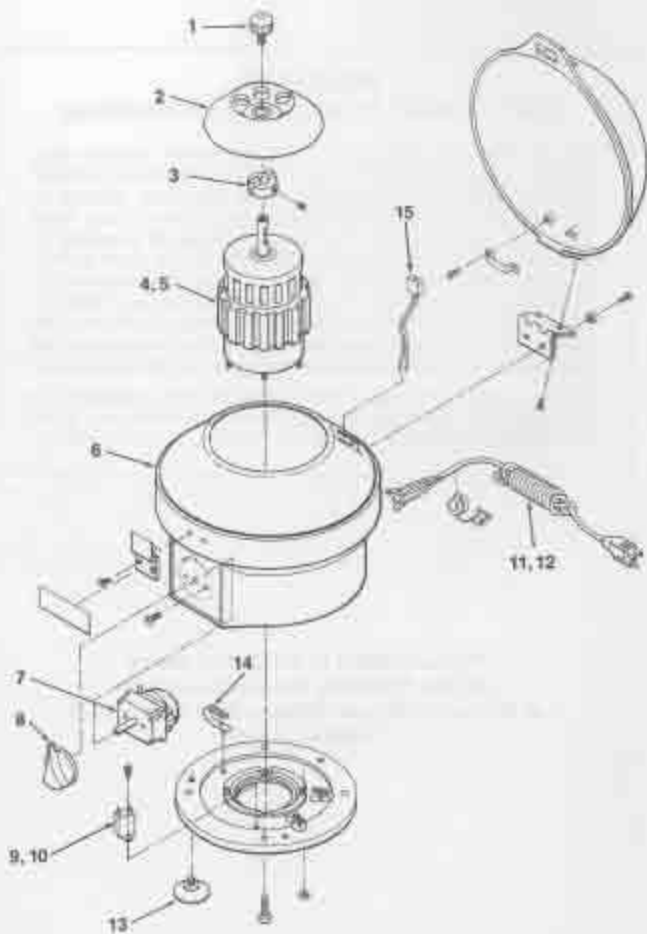


Figure 5-6. Compact II Centrifuge, Exploded View

WARRANTY
CLAY ADAMS® Brand Compact II Centrifuge

Becton Dickinson Primary Care Diagnostics, (herein after referred to as Becton Dickinson), warrants the CLAY ADAMS Brand Compact II Centrifuge to be free from defects in workmanship and materials for a period of one (1) year from date of installation, provided the Centrifuge is operated in accordance with the Operator's Manual. During such period, Becton Dickinson agrees to replace or repair any parts which, in its sole judgment, are found to be defective, provided the Centrifuge has not been subjected to misuse or abuse. The warranty stated herein shall extend to the original consumer only and not to any subsequent consumer of the Centrifuge.

Becton Dickinson shall not be liable for any incidental or consequential damages. Becton Dickinson makes no other warranties, expressed or implied, except as stated herein.

**For assistance in the United States,
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